



LARRY HOGAN
GOVERNOR

STATE OF MARYLAND
OFFICE OF THE GOVERNOR

REQUEST FOR PRESIDENTIAL MAJOR DISASTER DECLARATION
COVER LETTER

September 27, 2021

The Honorable Joseph R. Biden
The White House
1600 Pennsylvania Avenue NW
Washington, DC 20500

Through: Ms. MaryAnn Tierney
Regional Administrator
FEMA Region III
Philadelphia, PA 19106

Dear President Biden:

Under the provisions of Section 401 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. §§ 5121-5207 (Stafford Act), as implemented by 44 CFR § 206.36, I request that you declare a major disaster for the State of Maryland as a result of tornadoes and severe flash flooding caused by the remnants of Tropical Depression Ida.

In accordance with 44 CFR § 206.36(b)(1-2), I have determined that the disaster is of such severity and magnitude that effective response is beyond the capabilities of the state, and that supplementary federal assistance is necessary. Specifically, I respectfully request a major disaster declaration for Individual Assistance for Anne Arundel and Cecil counties in Maryland.

I also request the Hazard Mitigation Grant Program to be made available to all 24 jurisdictions in Maryland. I reserve the right to add counties requesting additional assistance not set forth herein; and/or to provide supplemental information to this request if findings warrant such action.

On Sept. 1, I directed the Maryland Emergency Management Agency (MEMA) to raise the state's activation level from enhanced to partial activation. MEMA implemented the Consequence Management Operations Plan, which is the state's emergency operations plan, in order to coordinate state response and recovery activities throughout the incident period.

The local jurisdictions that declared a State of Emergency include Anne Arundel County, Cecil County, and the City of Annapolis on Sept. 2. In Anne Arundel County, the National Weather Service confirmed on Sept. 1 an EF-2 tornado with peak wind estimates of 125 mph touched down in the southern part of the county and traveled approximately 11.5 miles into the City of

Annapolis. The tornado caused substantial structural damage to both homes and businesses in the area.

Many roads, as well as commercial and residential sidewalks, throughout Anne Arundel County and the City of Annapolis were damaged and blocked due to exposed live wires and downed trees. The Annapolis Police Department closed portions of West Street for nearly 48 hours to allow local agencies and area utility companies to respond to gas leaks, perform extensive debris management, and restore essential services. Baltimore Gas and Electric (BGE) reported at the peak of the incident that approximately 2,300 Anne Arundel County customers were without power, and approximately 36 hours later, there were still 1,200 customers without power.

Preliminary damage assessments in Anne Arundel County and the City of Annapolis showed that 120 residences were damaged, six of which were destroyed, 36 sustained major damage, and 62 sustained minor damage. In Annapolis alone, the tornado displaced 37 residents and damaged 25 commercial structures, 15 of which were condemned. The City of Annapolis Community and Economic Development Division estimates that \$3,844,580 was lost from business revenue and destroyed inventory as a result of the event. Some of the communities impacted have significant socioeconomic challenges, and numerous homeowners reported that they were uninsured or underinsured.

A family assistance center was opened for two days in collaboration with state and local partners, including Anne Arundel County Public Schools, Maryland Insurance Administration, American Red Cross, Inspections and Permits, Crisis Response System, Feed Anne Arundel, Social Services, and Helping Hands of America, Inc. The assistance center provided information to affected residents on housing, financial, feeding, and counseling support. Social Services and Crisis Response assisted displaced residents by providing accommodations in local area hotels. The City of Annapolis provided 26 hotel room nights to city residents who were immediately displaced by the tornado, and opened an emergency shelter at the Pip Moyer Recreation Center. The city also opened a community resource center to provide impacted residents with relief and recovery services. To help facilitate debris removal, the city provided residents with community dumpsters, cleanup supplies, and a one-time Tree Corrective Action Agreement, which allows the Annapolis Department of Public Works to provide tree corrective actions free of charge to residents unable to afford these services from private contractors.

In Cecil County, Stone Run Creek, which runs through the Town of Rising Sun, overflowed its banks and flooded 21 manufactured homes in the Mill Creek Manor Mobile Home Park, requiring the evacuation of 63 residents. Due to safety concerns during the COVID-19 pandemic, displaced residents were placed in a non-congregate shelter at a local hotel. The local human services and health departments and the American Red Cross initially assisted in providing clothing, food, and childcare needs to the evacuees. The Cecil County Department of Community Services then worked with shelter organizations in the county to continue providing food and shelter. Cecil County Public Schools also provided meal assistance to the families, and has coordinated transportation for the children so that they can continue attending classes at school.

Since the evacuation on Sept. 1, seven people have found other housing accommodations. Of the 56 persons still being sheltered in the hotel, 27 are adults, and the remaining 29 are children. The majority of displaced residents from the community speak Spanish as their primary language, which can present challenges when providing assistance. Most of the residents do not have any insurance coverage and lost most of their possessions in the flood.

As of Sept. 18, it has cost \$16,295 to shelter and feed the displaced residents, which is an average of \$71.30/per night, and includes local, state, and federal dollars. Funding for these sheltering operations remains viable until Sept. 30, and the county is currently attempting to enroll the families in rapid rehousing and rental subsidy programs. However, there are long waiting periods of more than 60 days to connect families to affordable housing through these programs.

Individual Assistance Joint Preliminary Damage Assessments were conducted in both Anne Arundel and Cecil counties on Sept. 13. The findings were as follows: six destroyed, 51 major, 68 minor, and 17 affected, for a total of 142 damaged residences. Additional information on the results of these assessments can be found in Enclosure A.

The most recent data available for Maryland's Total Taxable Resources (TTR) is from 2018. As of that time, the state's TTR was \$494.5 billion. Additional financial information can be found in Enclosure A.

The following data shows the demographics of the impacted population:

<i>Percentage of the population:</i>	<i>for whom poverty status is determined</i>	<i>Pre-disaster unemployment rate</i>	<i>65 years and older</i>	<i>18 years and younger</i>	<i>with a disability</i>	<i>who speak a language other than English</i>
Data Source	US Census Bureau	MD State Archives	US Census Bureau	US Census Bureau	US Census Bureau	US Census Bureau
National Average	11.4%	5.2%	16.5%	22.3%	8.6%	21.6%
State Average	9.0%	6.8%	15.9%	22.1%	7.5%	19%
Anne Arundel	5.8%	5.8%	15.0%	22.3%	7.5%	11.4%
Cecil	10.3%	5.9%	16.2%	22.5%	10.5%	5.5%

Joint Preliminary Damage Assessments for Public Assistance are ongoing and a separate or amended request for a Public Assistance Disaster Declaration may be submitted at a later date.

I have designated Russell J. Strickland, executive director of MEMA, as the Governor's Authorized Representative (GAR) for this request. Director Strickland is authorized to provide additional information or justification on my behalf.

Sincerely,

Larry Hogan
Governor



Enclosures

OMB No. 1660-0009/FEMA Form 010-0-13

A: Supplemental Information for Individual Assistance

C: Estimated Assistance from Other Federal Agency Programs

E: Weather Impact Summary

DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
REQUEST FOR PRESIDENTIAL DISASTER DECLARATION
MAJOR DISASTER OR EMERGENCY

OMB Control Number 1660-0009
Expires 09/30/2019

1. Request Date Sep 27, 2021

Burden Disclosure Notice

Public reporting burden for this form is estimated to average 9 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and submitting the form. This collection of information is required to obtain a benefit. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing the burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 500 C Street SW, Washington, DC 20472, Paperwork Reduction Project (1660-0009). **NOTE: Do not send your completed form to this address.**

Completion of this form including applicable attachments satisfies legal requirements for emergency and major disaster declaration requests under 42 U.S.C. §§ 5170 and 5191, respectively, as implemented at 44 C.F.R. §§ 206.35 and 206.36. Failure to use this form may result in a failure to meet these requirements and/or a delay in processing the request.

2a. Name of State (as defined in Stafford Act 102, 42 U.S.C. § 5122) or Indian tribal government requesting declaration.

Maryland

2b. Population (as reported by 2010 Census) or estimated population of Indian tribal government's damaged area(s).

6,177,224

3. Governor's or Tribal Chief Executive's Name

Larry J. Hogan

4. Designation of State or Tribal Coordinating Officer upon declaration (if available) and phone number

Jessica Nusbaum, 443-386-1287

5. Designation of Governor's Authorized Representative or Tribal Chief Executive Representative upon declaration (if available) and phone number

Russell J. Strickland, 410-517-3601

6. Declaration Request For: ☒ Major Disaster (Stafford Act Sec. 401) ☐ Emergency (Stafford Act Sec. 501(a))

7. Incident Period: Beginning Date Aug 31, 2021 End Date Sep 4, 2021 or ☐ Continuing

If requesting a "continuing" incident period, enclose an official statement from a qualified Federal Government agency acknowledged as a national authority in a specific incident field (e.g., United States Geological Survey for seismic incidents, the National Weather Service for flooding).

7b. Type of Incident (Check all that apply)

- ☐ Drought ☐ Earthquake ☐ Explosion ☐ Fire ☒ Flood ☐ Hurricane ☐ Landslide ☐ Mudslide
☐ Severe Storm ☐ Snowstorm
☒ (rain, high water, wind-driven, rain, hail, lightning) ☐ (Must include Enclosure D: Historic and Current Snowfall Data) ☐ Straight-Line Winds
☐ Tidal Wave ☒ Tornado ☒ Tropical Depression ☐ Tropical Storm ☐ Tsunami ☐ Volcanic Eruption ☐ Winter Storm
☐ Other (please specify) _____

8. Description of damages (Short description of impacts of disaster on affected area and population). Include additional details in enclosed Governor's or Tribal Chief Executive's cover letter.

Tropical Depression Ida brought substantial rain and severe storms to Maryland, leading to flooding, tornadoes, and associated damages. An EF-2 tornado touched down in Anne Arundel County, significantly damaging homes and businesses along its 11-mile path. Another tornado in Dorchester County damaged numerous farms and businesses. Torrential rains led to flooding across the entire State, but especially in Carroll, Cecil, Frederick, Montgomery, and Washington counties. Flash flooding in Montgomery County caused one storm-related fatality. In Cecil County, flooding destroyed 18 homes in a trailer park. Private residences, businesses, and government infrastructure were all damaged during this event. Roads were closed and many residents were without power for several days following the storm.

9. Description of the nature and amount of State and local or Indian tribal government resources which have been or will be committed. Include additional details in enclosed Governor's or Tribal Chief Executive's cover letter.

The Maryland Emergency Management Agency activated the State Emergency Operations Center to Partial level, activating numerous State Coordinating Functions and their associated State agencies. County EOCs were activated and emergency responders, USAR, swift water rescue, and other specialized teams were deployed. Numerous State agencies were activated in the SEOC to monitor and provide support, and have been involved in disaster recovery operations. The Civil Air Patrol was utilized for aerial photographing of impacted areas. Local jurisdictions, with support from State agencies, coordinated emergency protective measures, congregate and non-congregate sheltering, damage assessments, family assistance centers, town hall meetings, debris removal, public information and outreach, refuse disposal, and numerous other public response and recovery services.

10. Joint Preliminary Damage Assessment*

☒ Individual Assistance Dates Performed Requested Sep 8, 2021 Start Sep 13, 2021 End Sep 13, 2021

Individual Assistance Accessibility Problems (Areas that could not be accessed, and why)

No accessibility problems were reported. The preliminary damage assessments confirmed 6 residences destroyed, 51 with major damage, 68 with minor damage, and 17 affected (142 total).

☒ Public Assistance Dates Performed Requested Sep 8, 2021 Start _____ End TBD

Public Assistance Accessibility Problems (Areas that could not be accessed, and why)

No accessibility problems were reported. Public Assistance PDAs are being conducted virtually, and are still underway.

11. Programs and Areas Requested

Individual Assistance ☐ N/A ☐ Individuals and Households Program ☐ Crisis Counseling Program ☐ Disaster Unemployment Assistance

☒ All ☐ Disaster Case Management ☐ Disaster Legal Services ☐ Small Business Administration (SBA) Disaster Assistance

For the following jurisdictions, specify programs and areas (counties, parishes, independent cities; for Indian tribal government, list tribe(s) and/or tribal area(s)) If additional space is needed, please enclose additional documentation).

The State of Maryland and the following counties: Anne Arundel and Cecil, with the option to request additional counties as needed.

For States, identify Federally-recognized Tribes in the requested counties (if applicable).

There are no Federally-recognized tribes in the requested counties.

Please see **Enclosure A: Supplemental Information for Individual Assistance** for additional information in support of this request*.

**Not Required for Emergency Declaration Request*

11. Programs and Areas Requested (Continued)

Public Assistance ☐ N/A ☐ Debris Removal (Category A) ☐ Emergency Protective Measures (Category B) ☐ Permanent Work (Categories C-G)*
(not available for Emergency Declaration Requests)

For the following jurisdictions, specify programs and areas (counties, parishes, independent cities; for Indian tribal government, list tribe(s) and/or tribal area(s)). If additional space is needed or your request includes different categories of work for different jurisdictions; please enclose additional documentation.

Public Assistance PDAs are ongoing, and it has not been determined if Public Assistance will be requested. A separate or amended Presidential Disaster Declaration request may be submitted at a later date.

For States, identify Federally-recognized Tribes included in the requested counties (if applicable).

Please see **Enclosure B: Supplemental Information for Public Assistance** for additional information in support of this request*.

Indemnification for Debris Removal Activity

☐ I do not anticipate the need for debris removal.

I anticipate the need for debris removal, which poses an immediate threat to lives, public health and safety. Pursuant to Sections 403 and 407 of the Stafford Act, 42 U.S.C. §§ 5170b & 5173, the State or Indian tribal government agrees to indemnify and hold harmless the United States of America for any claims arising from the removal of debris or wreckage for this disaster. The State or Indian tribal government agrees that debris removal from public and private property will not occur until the landowner signs an unconditional authorization for the removal of debris.

Request for Direct Federal Assistance

☒ I do not request direct Federal assistance at this time.

☐ I request direct Federal assistance for work and services to save lives and protect property, and:

a. I request the following type(s) of assistance:

b. List of reasons why State and local or Indian tribal government cannot perform, or contract for, required work and services.

c. In accordance with 44 C.F.R. § 206.208, the State or Indian tribal government agrees that it will, with respect to direct Federal assistance: (1) Provide without cost to the United States all lands, easements, and rights-of-ways necessary to accomplish the approved work; (2) Hold and save the United States free from damages due to the requested work, and shall indemnify the Federal Government against any claims arising from such work; (3) Provide reimbursement to FEMA for the non-Federal share of the cost of such work in accordance with the provisions of the FEMA-State or FEMA-Tribe Agreement ; and (4) Assist the performing Federal agency in all support and local jurisdictional matters.

Request for Snow Assistance

☒ N/A ☐ I request snow assistance.

Snow assistance for the following jurisdictions (Specify counties, independent cities or tribes and/or tribal areas).

Please see **Enclosure D: Historic and Current Snowfall Data** for additional information in support of this request*.

*Not Required for Emergency Declaration Request

11. Programs and Areas Requested (Continued)

Hazard Mitigation* ☒ Statewide

OR

For the following specific counties, parishes, independent cities or tribes and/or tribal areas.

12. Mitigation Plan Information*

a. Mitigation Plan Expiration Date August 23, 2026

b. Type of Plan

☐ Enhanced☒ Standard

13. Other Federal Agency Programs

☐ I do not anticipate requirements from Other Federal Agencies☒ I do anticipate requirements from Other Federal AgenciesPlease see **Enclosure C**: Requirements for Other Federal Agency Programs for additional information in support of this request*.

14. Findings and Certifications

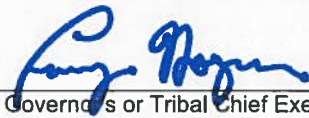
☒ I certify the following:

a. I have determined that this incident is of such severity and magnitude that effective response is beyond the capabilities of the State and the affected local government or Indian tribal government and that supplementary federal assistance is necessary.

b. In response to this incident, I have taken appropriate action under State or tribal law and have directed the execution of the State or Tribal Emergency Plan on Sep 1, 2021 in accordance with the Stafford Act.

c. The State and local governments, or Indian tribal government will assume all applicable non-Federal share of costs required by the Stafford Act.

15. List of Enclosures and Supporting Documentation

☒ Cover Letter ☒ Enclosure A (Individual Assistance)*☐ Enclosure B (Public Assistance)*☒ Enclosure C (Requirements for Other Federal Agency Programs)☐ Enclosure D (Historic and Current Snowfall Data)☒ Additional Supporting Documentation Enclosure E: Weather Impact Summary

Governor's or Tribal Chief Executive's Signature

September 27, 2021
Date

If anyone except the Governor or Tribal Chief Executive signs this document, please provide the documentation that establishes that this individual has the legal authority to act on behalf of the Governor or Tribal Chief Executive.

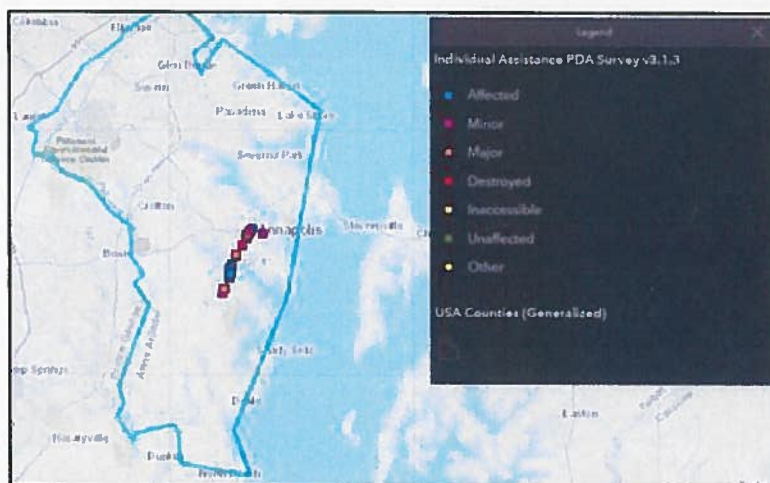
*Not Required for Emergency Declaration Request

Enclosure A: Supplemental Information for Individual Assistance

Individual Assistance Preliminary Damage Assessment Results

	IA Degree of Damage					
	County	Destroyed	Major	Minor	Affected	Total
PDA start-end: 9/13/2021-9/13/2021	Anne Arundel	6	36	62	16	120
PDA start-end: 9/13/2021-9/13/2021	Cecil	0	15	6	1	22
	Total	6	51	68	17	142

Map of Anne Arundel County PDA Locations



Map of Cecil County PDA Locations



Individual Assistance Declaration Factors

A. State Fiscal Capacity and Resource Availability

Under normal conditions, the State of Maryland is considered to have a relatively high State Fiscal Capacity. However, the impacts of the COVID-19 pandemic over the past 18 months have greatly reduced the State's fiscal capacity and resource availability. Management of the pandemic has necessitated mobilization of State resources at an unprecedented level. Pandemic management, social services, and economic stimulus have required increased government spending, while economic impacts of the pandemic have reduced tax revenue.

State resources were deployed to assist with response efforts during Tropical Depression Ida, and continue to be deployed for recovery efforts. Most notably, displaced residents have required sheltering in Anne Arundel, Cecil, and Montgomery counties. Due to safety concerns during the pandemic, the sheltering operations were quickly transitioned to a non-congregate format, typically utilizing hotels. The increased cost of non-congregate sheltering, feeding, and wrap-around services has put an extra strain on State and local resources. The currently identified funding sources for these sheltering operations will be exhausted on September 30th. Additional funds and/or resources are required to continue sheltering displaced residents, and to implement temporary housing solutions.

B. Uninsured Home and Personal Property Losses

Joint Preliminary Damage Assessments confirmed that 142 residences were damaged by Tropical Depression Ida. Of these residences, 32 were declared uninhabitable by public officials. Numerous houses have reported being uninsured or underinsured; however, not all homeowners were able to be reached during PDAs, so exact numbers of uninsured residences are not available at this time.

A total of 57 residences sustained major damage or were destroyed. Many of these residences were infiltrated by water, damaging or destroying the contents within. Numerous trees were blown down, many onto homes, vehicles, and other personal property.

C. Disaster Impacted Population Profile

Listed below is the population profile for the Edgewater area of Anne Arundel County:

- Percentage below poverty level: 9.2%
- Median household income: \$89,349
- Percentage of elderly (65+): 18.3%

- Percentage under 18 years old: 17.3%
- Percentage of disabled: 8.1%
- Percentage that speak a language other than English: 13.1%
- Pre-disaster unemployment rate: 5.8%

Listed below is the population profile for the City of Annapolis:

- Percentage below poverty level: 11%
- Median household income: \$85,636
- Percentage of elderly (65+): 15.5%
- Percentage under 18 years old: 21.7%
- Percentage of disabled: 8.5%
- Percentage that speak a language other than English: 21.6%
- Pre-disaster unemployment rate: Unavailable

Listed below is the population profile for Cecil County:

- Percentage below poverty level: %10.3
- Median household income: \$76,887
- Percentage of elderly (65+): 16.2%
- Percentage under 18 years old: 22.5%
- Percentage of disabled: 10.5%
- Percentage that speak a language other than English: 5.5%
- Pre-disaster unemployment rate: 5.9%

NOTE: The community impacted in Cecil County has a profile that differs from that listed above, with a significantly higher percentage (near 100%) of persons speaking a language other than English, and a much lower median income.

D. Impact to Community Infrastructure

As a result of high winds from the tornado, there were many downed trees and powerlines throughout the impacted areas in Anne Arundel County, as well as damage to roads and sidewalks. Substantial debris removal was required, and cleanup is still underway.

The Annapolis Police Department closed portions of West Street, a major arterial road that was impassable, for nearly 48 hours to allow the Department of Public Works, Annapolis Fire Department, and area utility companies to respond to gas leaks, perform extensive debris management, and restore essential services.

Power outages in the area peaked at around 2,300, and 1,200 customers in the Annapolis area were without power for 36 hours or more.

E. Casualties

There was one fatality in Maryland directly attributed to this storm, which was a flood-related drowning in the early morning hours of September 1st, in Montgomery County.

F. Disaster Related Unemployment

In Anne Arundel County, 25 commercial structures were damaged by Tropical Depression Ida, of which 15 were condemned by public officials. In Cecil County, 37 businesses reported damages from the storm.

There have been no direct reports of disaster-related unemployment. However, it is likely that the businesses damaged, especially the 15 condemned, will have negative impacts on their employees, their continued operation, and the entire community.

Enclosure C: Estimated Assistance from Other Federal Agency Programs

County/ Tribal Area	SBA Home Loans	SBA Business Loans	FSA Loans	NRCS	FHWA	USACE	BIA	OTHER
Anne Arundel	Yes – Quantity TBD	Yes – Quantity TBD						TBD
Cecil	Yes – Quantity TBD	Yes – Quantity TBD						TBD
Totals	TBD	TBD						TBD

Enclosure E: Weather Impact Summary for the Remnants of Hurricane Ida in Maryland

Weather Overview

The remnants of Hurricane Ida interacted with an existing front, setting the stage for a significant severe weather and heavy rain event for the state of Maryland. Between August 31 and September 2, 2021, widespread 2-4" of rain fell across most of Maryland counties, with several areas seeing 6-8"+ in less than 24 hours. This dangerous situation resulted in deadly flash flooding. Severe thunderstorms also developed with areas of wind damage and produced multiple tornadoes; some of which were damaging and long-tracked.

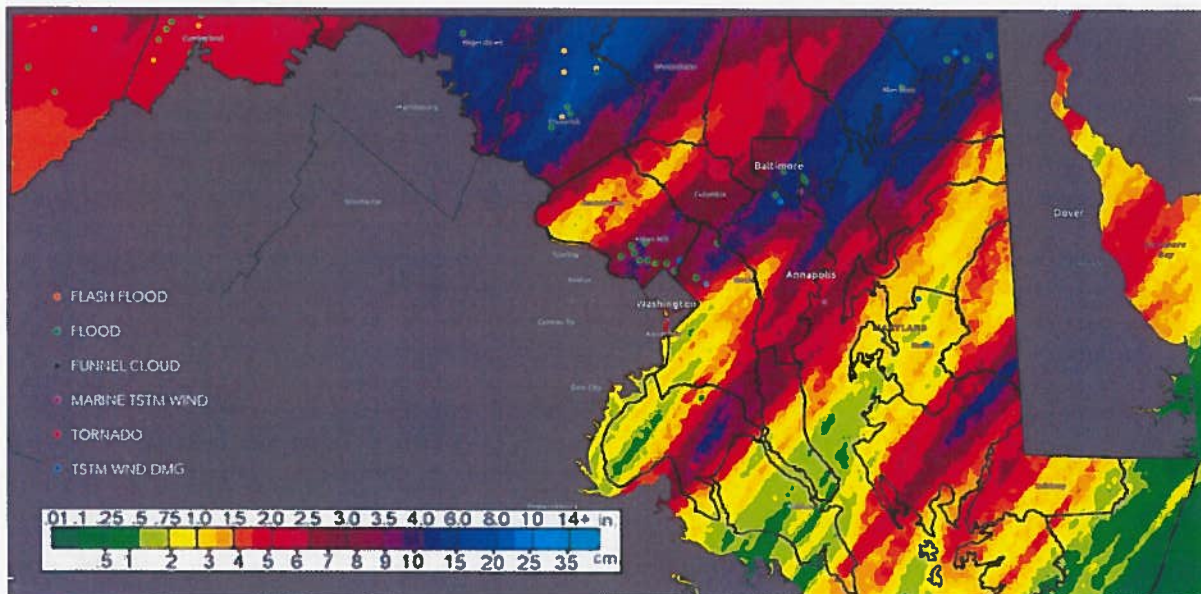


Figure 1. Rain estimates and observations show widespread, heavy rainfall especially within and along the Catocin and Appalachian Mountains as well as the I-95 Corridor from the Washington D.C. suburbs to northeast Maryland.

Stormy Pattern Leading Up to Ida

Maryland has been no stranger to severe weather and flooding rains. During the mid to late summer of 2021, the state has seen a pattern of high density and seemingly consistent flood-inducing thunderstorms. In July and August, northeast Maryland has seen several instances of stalled or back-building thunderstorms resulting in significant flash flooding and road closures, which all dangerously lasted through the pre-dawn hours. Maryland also saw an extremely active severe weather season in the late summer, with the Baltimore/Washington D.C. National Weather Service office (LWX) issuing more Severe

Thunderstorm Warnings (516) than any other office in the nation. Severe thunderstorms produce very heavy rainfall which leads to saturated soils and moderately full rivers. According to official rainfall measurements, most of Maryland saw well above average rainfall for the month of August 2021, with some pockets of 8-12"+ for the month. The climatological average monthly rainfall for these areas is closer to 3-4".

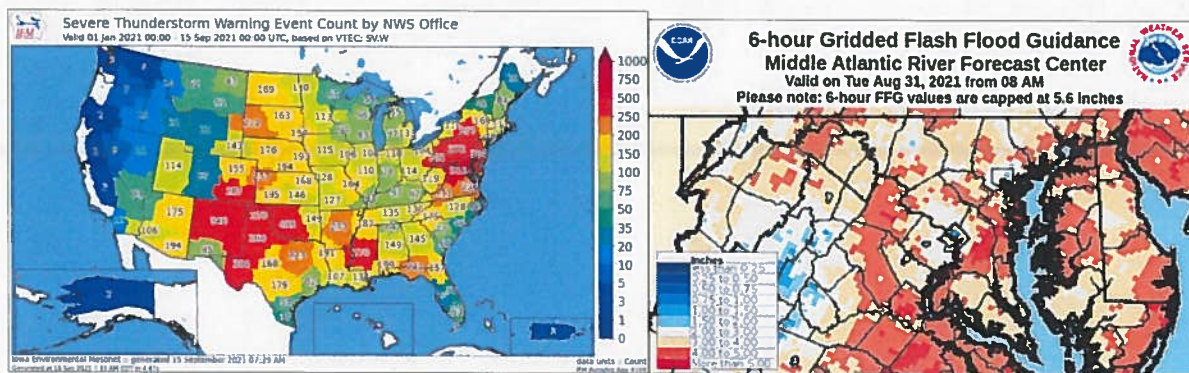


Figure 2. On the left, the number of issued Severe Thunderstorm Warnings showcases the active severe weather for Maryland. On the right, the August 31st flash flood guidance for the state depicts how little rainfall was needed for flash flooding to occur due to the active severe weather pattern. Compared to rainfall forecasts and eventual observations from Ida's remnants, flooding was anticipated.

Forecast Lead-Up

Leading up to the event, forecasts called for a moderate risk for flash flooding for nearly three-quarters of Maryland. The far southeastern region of the state was in a slight to marginal Risk, according to NOAA's Weather Prediction Center's (WPC) Excessive Rainfall Outlook. A high risk, which is a rare occurrence, was issued just along the Maryland-Pennsylvania border and did encompass extreme northwest Garrett County, MD. These high risk designations are reserved for life-threatening and damaging flash flood events. The most recent high risk issued for portions of Maryland, was during Isaias in 2020. Rainfall forecasts depicted confidence in the northern half of the state seeing at least 1.5" with totals closer to 3-4"+ near to the Pennsylvania border. Southern portions of the state were expected to receive between 0.25-1". A 'reasonable worst-case rainfall' forecast was released showing the potential for even higher amounts. These ranged from 1-2" in the Lower Eastern Shore to just over 5" across the far northern counties. Flash Flood Watches were issued on August 30th for all Maryland counties west of the Chesapeake Bay for heavy downpours, and on the 31st, the Upper Eastern Shore counties were included in the Watch.

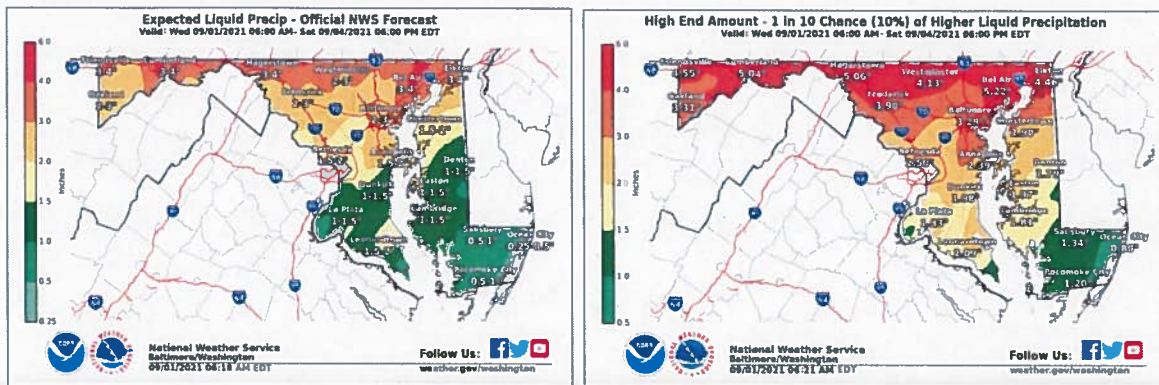


Figure 3. The map on the left shows the NWS's expected rainfall totals for the state of Maryland, while the map on the right depicts the 'reasonable worst-case' rainfall amounts from Hurricane Ida's remnants.

In addition to heavy rainfall, the stage for widespread severe weather was setting up for most of the state. NOAA's Storm Prediction Center (SPC) had issued a "slight risk" on August 31st for late-night/early-morning severe thunderstorms in the Central MD region with the flash flooding potential outlined for any cells that developed. A Tornado Watch was issued for Central Maryland from 12:55 AM through 8:00 AM September 1st. The SPC then issued an "enhanced risk" for severe thunderstorms for the afternoon/evening of September 1st, which included a rare 10% tornado probability; a high-end tornado probability for this part of the country. This "enhanced risk" was issued due to the confidence of severe thunderstorm development as the energy of Ida's remnants moved across Maryland. For the second time in one day, a second Tornado Watch was issued for Central Maryland as well as Southern Maryland and the Lower Eastern Shore from 11:40 AM - 7:00 PM. The Upper Eastern Shore was soon included in a Tornado Watch.

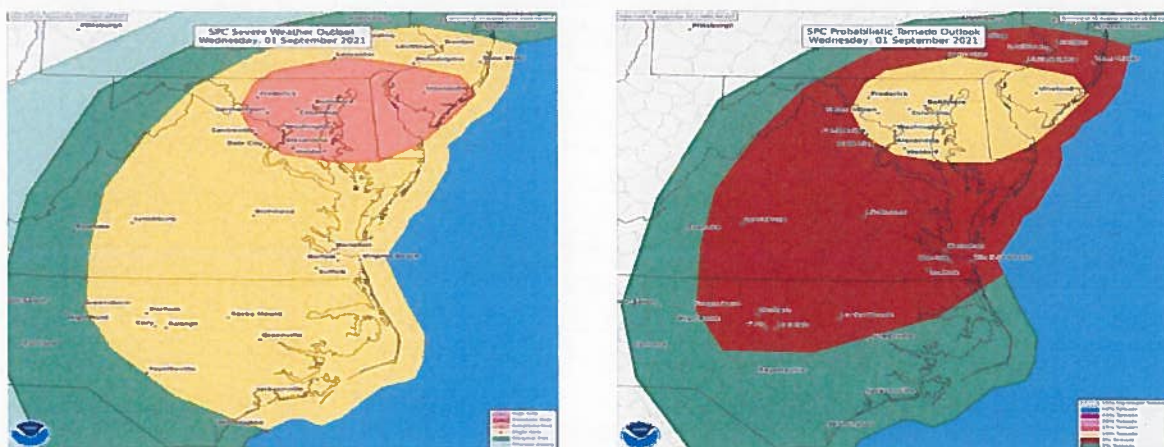


Figure 4. The Storm Prediction Center's map on the left shows the extent of the "enhanced risk" for severe thunderstorms. The rare 10% tornado probability can be seen issued for Maryland's heartland.

"Several tornadoes and occasional damaging winds appear probable across parts of the Mid-Atlantic as the remnants of Ida move through the region this afternoon through this evening", stated the SPC's outlook for September 1st.

Ida Rainfall

Rainfall from Ida was impressive. Some stations across Maryland showed nearly two months-worth of rainfall during this period, with most falling during a few hours. Quality-controlled rainfall measurements are acquired through multiple, official avenues which include ASOS, CoCoRaHS, Co-Op observers, trained spotters, and NWS employees. Five counties west of the Chesapeake saw over a half-foot of rain. Several Frederick County sites recorded over 6". A site just outside of Frederick City reported 8.15", one of the highest single-day totals on record.

<i>City</i>	<i>County</i>	<i>Rainfall</i>	<i>Source</i>
Frederick	Frederick	8.15"	CoCoRaHS
Williamsport	Washington	6.93"	Co-Op Observer
Emmitsburg	Frederick	6.80"	Trained Spotter
Thurmont	Frederick	6.47"	CoCoRaHS
Taneytown	Carroll	6.43"	CoCoRaHS
Cresaptown	Allegany	6.35"	Trained Spotter
Woodlawn	Cecil	6.18"	Trained Spotter
Conowingo	Harford	5.91"	Co-Op Observer

Table A. A few official rainfall reports show the widespread nature of Ida's rainfall over several Maryland counties.

Rainfall observations and estimates for 6 and 12-hour periods correlate to 100-year flood levels for most of these stations, with a 200-year correlation for areas that saw over 6.31" in 6 hours. Exacerbated by higher-than-average stream levels from prior weeks of severe weather, streams easily rose further. The Monocacy River in Frederick, MD reached an all-time historical gauge height of 25.86'. This beats the old record height of 25.56' set back in 2012 during Superstorm Sandy. Several Flash Flood and Areal Flood Warnings were issued across the state in lieu of the heavy rains and rising streams. In Harford and Cecil Counties, roads were closed due to flooding from torrential rains. In Montgomery County, deaths were attributed to heavy downpours and cloudbursts that flooded ground-level apartments during the early morning hours of September 1st. Over 150 road closures were reported due to flooding and downed trees across the state during the storm's peak. Frederick County alone saw 83 road closures from flooding and debris cover. Rapid stream level rises were noted on stream gauges across the state, presenting Ida's immediate impact on Maryland's watersheds. 4.82" at BWI Thurgood Marshall Airport set a daily rainfall record for September 1st for that location.

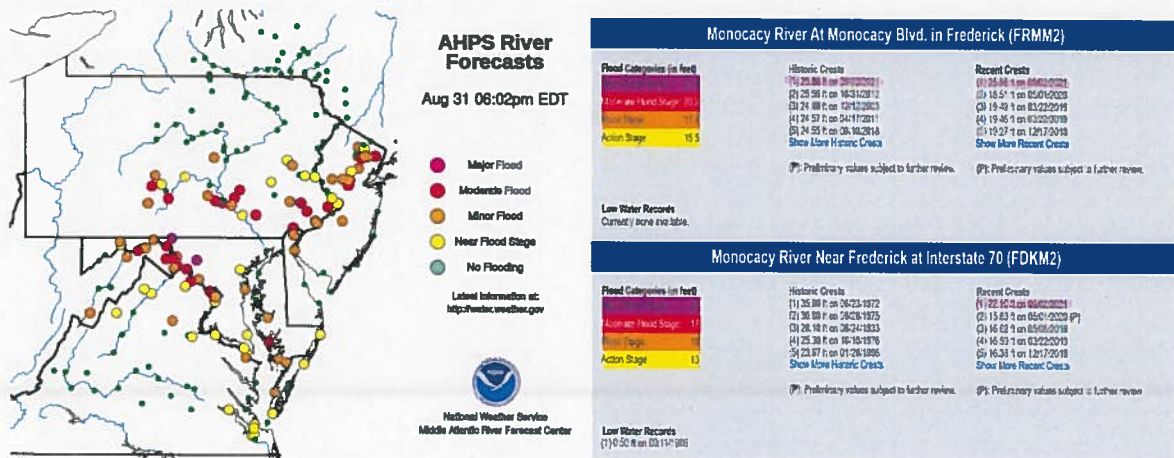


Figure 5. The NOAA River Forecast on the left clearly shows forecasted widespread flooding levels for Maryland streams. The chart on the right lists the historic and recent crests for the Monocacy River in Frederick, MD. The new river height record was set during Ida's rainfall.

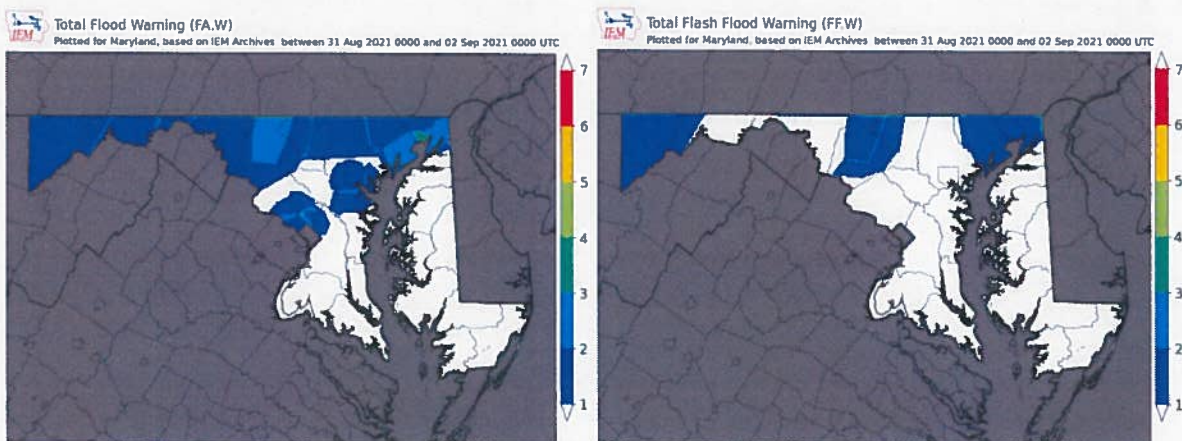


Figure 6. Areal (left) and Flash Flood (right) Warnings issued for Maryland counties to alert residents of Ida's dangerous rainfall rates and rising streams.

Tornadoes from Ida

On average, Maryland sees about 10 tornadoes per year. As Ida made its way into the region, the severe weather and tornado potential was increasing. Tornado Watches were in effect for all Maryland counties east of the Appalachian Mountains from 11:40 AM to 7:00 PM. From a period between 1:11 PM through 6:31 PM, 21 Tornado Warnings were issued for portions of Maryland. Historically, this is the second-highest number of Tornado Warnings issued from any tropical system to sweep through the state since 1990; only behind Isaias (2020) with 23 issued. Five tornadoes were reported, four of which have been confirmed by the National Weather Service. One of the tornadoes impacted the

state's capital, Annapolis. This tornado was categorized as a "long-track" and damaging EF-2. An EF-2 on the Enhanced Fujita Scale, classifies this tornado as a "strong" tornado, capable of heavy and life-threatening damage to buildings, infrastructure, and power grids. This tornado did extensive damage to the Annapolis suburbs and metro. Homes and businesses were heavily damaged or destroyed. Power lines were brought down and roads were closed from scattered debris. Widespread power outages were reported in the immediate area. This EF-2 was one of the strongest tornadoes to hit the state in the past decade. A tornado in Baltimore County was confirmed as an EF-0 as well as two in Dorchester County near the town of Hurlock and New Market.

<i>County</i>	<i>City</i>	<i>Rating</i>
Anne Arundel	West River to Annapolis	EF-2
Baltimore	Edgemere	EF-0
Dorchester	1 mile N of Hurlock	EF-0
Dorchester	2 miles NW of Hurlock	EF-0

Table 2. Four confirmed tornadoes in Maryland ranged from EF-0 to EF-2 from Ida's remnants.

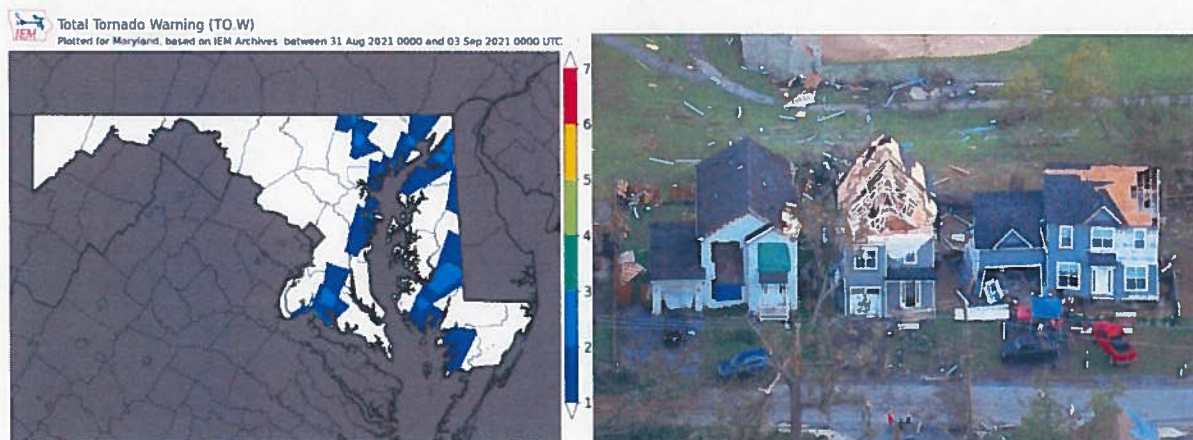


Figure 7. 21 Tornado Warnings were issued for Maryland counties in just a 5-hour period, shown on the left. The photo on the right is along the EF-2 tornado's track in Anne Arundel County. Homes and businesses were damaged and destroyed along its 11.25 mile path.

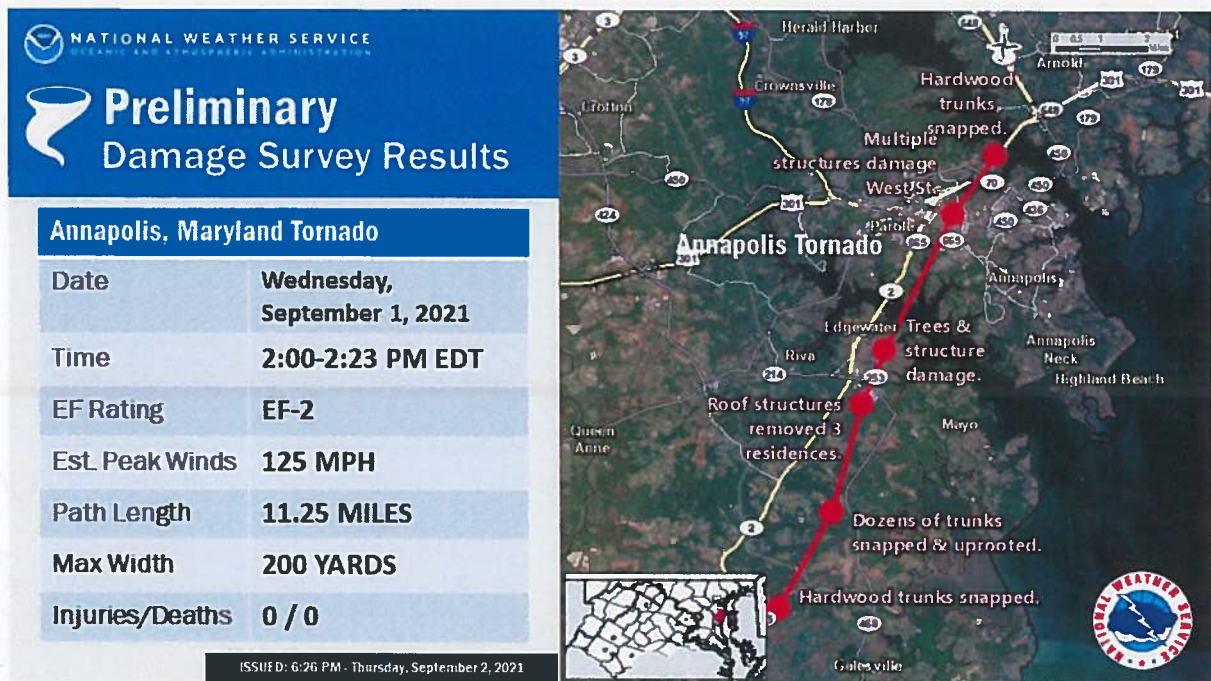


Figure 8. 21 The preliminary damage survey results summary from the National Weather Service, for the EF-2 tornado that occurred in Anne Arundel County and went through the State Capitol of Annapolis.

Scope of Ida's Impacts

Hurricanes Ida's remnants made a strong impact on Maryland from the late hours of August 31 through the early morning hours of September 2, 2021. During this period, record rainfall was observed, historic stream heights were measured, multiple damaging tornadoes occurred, and severe thunderstorms impacted much of the state. Several counties saw impacts from multiple types of hazards, including flooding, high winds, tidal flooding, severe thunderstorms, and tornadoes. Impacts were widespread, as every Maryland county was affected by Ida.



Figure 9. A dashboard summarizing the scope of weather impacts from Ida.